

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

(DRAFT)

Title V / Synthetic Minor, Operating

Permit: V-09-010

Jim Beam Brands Co. Plant #2 - Booker Noe Distillery

Boston, KY 40107

March 16, 2009

Chris Walling, Reviewer

SOURCE ID: 21-179-00014

AGENCY INTEREST: 3261

ACTIVITY: APE20080002

SOURCE DESCRIPTION:

On December 15, 2008, the source applied to the Division for the renewal of their operating permit V-03-009 R5 for the operation of a bourbon distillery facility in Boston, Kentucky. The facility makes distilled spirits. Grain is unloaded and conveyed to hammermills where it is ground. The grain is fed into mash cookers along with water, and the grain starches are converted to sugars by heating. The cooked grain/water mixture is fed into fermenter vessels as a batch operation to convert the sugars into ethanol. After an appropriate residence time, the mixture is processed through distillation columns and condensers. The condensed liquid is fed to spirit tanks and then gauged at the cistern tanks prior to barrel filling. The spent stillage is then dried with a ring dryer and put into a storage room. Whiskey from the cistern tanks is put into barrels until the appropriate age is reached. The barrels are then gravity dumped, rolled, and rinsed at the dumping station. After dumping, the whiskey is fed to the regauge tanks, where it may be processed and sent to be loaded for shipment.

The facility has expanded its capacities under a series of permit revisions to approximately 31% of its previous capacity. To preclude the applicability of 401 KAR 51:017, Prevention of Significant Deterioration, for Emission Units 03, 04 and 07, the net emissions increase of VOC and NOx shall not exceed 35 tons in any twelve (12) consecutive months(V-03-009R5). In this application the facility has requested to remove the operating limit and keep the emissions limits. Based on the date of commencement of the expansion project, baseline years for the emissions limits were 2002 and 2003.

The cyclone on the coal boiler was replaced with a modular pulse-jet baghouse using P-84 Polyamide needled felt operating at 99.8% efficiency. Also a lime injection system to control hydrogen chloride (HCl) has been installed upstream of the baghouse, reducing HCl by 78%. The Oil-fired boilers were replaced with a single Natural Gas-fired boiler. The process of drying out the mash after distillation has been modified a great deal, with all the components brought inside a single building, and all non-fugitive emission units serviced by a common baghouse. One warehouse was removed, and nine were added. The distillation process itself has been greatly expanded.

COMMENTS:

Emissions Unit 01 (01-001, 01-002, 01-003) Grain Handling Operations

Emissions Unit 01A (01-002, 01-004 & 01-006) Grain Handling Operations

Emissions Unit 10-006 Unpaved Roads

Emission Unit 03-001, Spent Stillage

Emission Unit 04 (04-001, 04-002) Spent Grain Drying

Emission Unit 05-001, Distiller's Dried Grain Storage Silos

Emission Unit 06-001, Distiller's Dried Grain Loading

Emission Unit 07, Barrel Filling, Aging, and Dumping

Emission Unit 08-002, Natural Gas-fired Indirect Heat Exchanger

Emission Unit 09-001, Spreader Stoker Coal-fired Indirect Heat Exchanger

APPLICABLE REGULATIONS:

401 KAR 59:010, New Process Operations, applicable to each affected facility not subject to another emission standard with respect to particulates in 401 KAR 59, and that commenced construction on or after July 2, 1975.

401 KAR 59:015, New Indirect Heat Exchangers, applicable to indirect heat exchangers having a heat input capacity of 250 MMBtu/hr or less and constructed on or after April 9, 1972.

401 KAR 60:005, incorporating by reference 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applicable to steam generating units commenced after June 9, 1989 that have a maximum design heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr.

401 KAR 61:015, Existing Indirect Heat Exchangers, applicable to indirect heat exchangers having a heat input capacity of less than 250 MMBtu/hr and constructed before April 9, 1972.

401 KAR 61:020, Existing Process Operations, for emissions unit commenced before July 2, 1975.

401 KAR 63:010, Fugitive Emissions, applicable to each affected facility which emits or may emit fugitive emissions and is not elsewhere subject to an opacity standard within the administrative regulations of the Division of Air Quality.

Emissions Unit 01 (01-001, 01-005) Grain Handling Operations
Emissions Unit 10 (06) Unpaved Roads

Capacity: 13,500 bushels/day; Constructed prior to 1972

401 KAR 63:010 for fugitive emissions will apply to grain handling and unpaved roads. No person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. No person shall cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and record the amount of grain received and processed on a monthly basis.

Pursuant to 401 KAR 50:055 Section 2, the baghouse shall be operated to maintain compliance with applicable requirements in accordance with manufacturer's specifications and standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, records regarding the maintenance of the baghouse shall be maintained.

Emissions Unit 01A (01-002, 01-004 & 01-006) Grain Handling Operations

Construction commenced before 1972 for emission point 01-002 and 01-006, July 2006 for emission point 01-004: Capacity: 13,500 bushels/day

Pursuant to 401 KAR 61:020, Section 3(1)(a), continuous emissions into the open air shall not exceed 40% opacity.

Pursuant to 401 KAR 61:020, Section 3(2), particulate matter emissions into the open air shall not exceed $[55 (P)^{0.11} - 40]$ pounds per hour based on three-hour average where P is the operating rate in tons per hour.

Pursuant to 401 KAR 61:020, Section 3(1)(a), any continuous emission(s) into the open air shall not equal or exceed forty (40) percent opacity.

Compliance Demonstration Method:

The source shall be deemed to be in compliance when baghouse, cyclones and covered conveyors are operated in accordance with manufacturer's specifications and/or standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visual observation of the opacity of emissions from the stack on a weekly basis and maintain a log of the observations. If any visible emissions are seen, then opacity must be determined by U.S. EPA Reference Method 9 and initiate an inspection of the control equipment for any necessary repairs.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and record the amount of grain received and processed on a monthly basis.

Pursuant to 401 KAR 50:055 Section 2, the baghouse shall be operated to maintain compliance with applicable requirements in accordance with manufacturer's specifications and/or standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, records regarding the maintenance of the baghouse shall be maintained.

Emission Unit 04-001, Natural Gas-fired Dryer:

Capacity: 38.73 MMBtu/hr, 47.8 ton/hr; Constructed July 2004

Pursuant to 401 KAR 59:010 Section 3(1)(a), continuous emissions into the open air shall not exceed 20% opacity.

Pursuant to 401 KAR 59:010 Section 3(2), particulate emissions into the open air shall not exceed $(17.31 \times [P]^{0.16})$ lbs / hour based on a three-hour average where P is the processing rate in tons / hour of spent grain entering the dryer. Compliance with the allowable particulate matter standard may be demonstrated by calculating particulate matter emissions using the spent grain processing rate and emission factor information as follows:

$$\text{PM emissions (lbs/hour)} = (0.12 \text{ lb/ton of spent grain input}^*) \times (\text{tons of spent grain processed averaged weekly in tons/hr})$$

* = emission factor from Pilot Test

Pursuant to 401 KAR 52:020 Section 26, the permittee shall monitor and record the amount of spent grain dried on a monthly basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visual observation of the opacity of emissions from the stack on a weekly basis and maintain a log of the observations. If any visible emissions are seen, then opacity must be determined by U.S. EPA Reference Method 9 and initiate an inspection of the control equipment for any necessary repairs.

Emission Unit 04-002, Distiller's Dried Grain Syrup Cyclone:

Constructed July 2004

Capacity: 33.4 tons/hr

Pursuant to 401 KAR 59:010, Section 3(1)(a), continuous emissions into the open air shall not exceed 20% opacity.

Pursuant to 401 KAR 59:010, Section 3(2), particulate emissions into the open air shall not exceed $(17.31 \times [P]^{0.16})$ lbs / hour based on a three-hour average where P is the processing rate in tons/hour of distillers dried grain syrup entering the cyclone. Compliance with the allowable particulate matter standard may be demonstrated by calculating particulate matter emissions using the distillers dried grain syrup processing rate, emission factor information, and baghouse control efficiency as follows:

$$\text{PM emissions (lbs/hour)} = (0.27 \text{ lb/ton of distillers dried grain syrup input}^*) \times (\% \text{ efficiency}^{**}) \times (\text{tons of distillers dried grain syrup processed averaged weekly in tons/hr})$$

* = emission factor from AP-42

** = 1 – baghouse efficiency

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and record the amount of spent grain dried on a monthly basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visual observation of the opacity of emissions from the stack on a weekly basis and maintain a log of the observations. If any visible emissions are seen, then opacity must be determined by U.S. EPA Reference Method 9 and initiate an inspection of the control equipment for any necessary repairs.

Pursuant to 401 KAR 50:055, Section 2, the baghouse shall be operated to maintain compliance with applicable requirements in accordance with manufacturer's specifications and/or standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, records regarding the maintenance of the baghouse shall be maintained.

Emission Unit 05-001, Distiller's Dried Grain Storage Silos:

One silo and cyclone:	construction commenced after 1991
Two silos and cyclones:	construction commenced after 2004
Operating Input:	5.2 tons/hr
Control Equipment:	baghouse, pulse jet, 99% efficiency (constructed after 2004)

Pursuant to 401 KAR 59:010, Section 3(1)(a), continuous emissions into the open air shall not exceed 20% opacity.

Pursuant to 401 KAR 59:010, Section 3(2), particulate emissions into the open air shall not exceed $(3.59 \times [P]^{0.62})$ lbs/hour based on a three-hour average where P is the processing rate in tons/hour of distillers dried grain entering the silos. Compliance with the allowable particulate matter standard may be demonstrated by calculating particulate matter emissions using the distillers dried grain processing rate, emission factor information, and baghouse control efficiency as follows:

PM emissions (lbs/hour) =
(0.27 lb/ton of distillers dried grain input*) x (% efficiency**)
x (tons of distillers dried grain loaded averaged weekly in tons/hr)

* = emission factor from AP-42

** = 1 – baghouse efficiency

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and record the amount of distillers dried grain processed on a monthly basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visual observation of the opacity of emissions from the stack on a weekly basis and maintain a log of the observations. If any visible emissions are seen, then opacity must be determined by U.S. EPA Reference Method 9 and initiate an inspection of the control equipment for any necessary repairs.

Pursuant to 401 KAR 50:055, Section 2, the baghouse shall be operated to maintain compliance with applicable requirements in accordance with manufacturer's specifications and/or standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, records regarding the maintenance of the baghouse shall be maintained.

Emission Unit 06-001, Distiller's Dried Grain Loading:

Two silos and cyclones: construction commenced after 2004
Max. Operating Rate: 30 tons/hr

Pursuant to 401 KAR 59:010, Section 3(1)(a), continuous emissions into the open air shall not exceed 20% opacity.

Pursuant to 401 KAR 59:010, Section 3(2), particulate emissions into the open air shall not exceed $(3.59 \times [P]^{0.62})$ lbs/hour based on a three-hour average where P is the processing rate in tons/hour of distillers dried grain being loaded. Compliance with the allowable particulate matter standard may be demonstrated by calculating particulate matter emissions using the distillers dried grain loading rate, emission factor information, and baghouse control efficiency as follows:

PM emissions (lbs/hour) = $(0.086 \text{ lb/ton of grain input}^*)$
 $\times (\% \text{ efficiency}^{**}) \times (\text{tons of distillers dried grain loaded averaged weekly in tons/hr})$

* = emission factor from AP-42

** = $1 - \text{baghouse efficiency}$

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and record the amount of distillers dried grain loaded on a monthly basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visual observation of the opacity of emissions from the stack on a weekly basis and maintain a log of the observations. If any visible emissions are seen, then opacity must be determined by U.S. EPA Reference Method 9 and initiate an inspection of the control equipment for any necessary repairs.

Pursuant to 401 KAR 50:055 Section 2, the baghouse shall be operated to maintain compliance with applicable requirements in accordance with manufacturer's specifications and/or standard operating practices.

Pursuant to 401 KAR 52:020, Section 26, records regarding the maintenance of the baghouse shall be maintained.

Emission Unit 08-002, Natural Gas-fired Indirect Heat Exchanger:

Maximum Continuous Rating: 88.85 MMBtu/hr
Construction commenced: after June, 2004

Pursuant to 401 KAR 59:015, Section 4(1)(c), particulate emissions shall not exceed 0.34 lb/MMBtu based on a 3-hour average.

Pursuant to 401 KAR 59:015, Section 4(2)(b), opacity emissions shall not exceed 20% except that a maximum of forty % opacity shall be permissible for not more than 6 consecutive minutes in any 60 consecutive minutes during cleaning the fire box or blowing soot.

Pursuant to 401 KAR 59:015, Section 4(2)(c), opacity emissions shall not exceed 20 % except for emissions during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 401 KAR 59:015, Section 5(1)(c), sulfur dioxide emissions shall not exceed 1.23 lb/MMBtu based on a 24 – hour average.

This unit is assumed to be in compliance with PM, opacity, and SO₂ standards, while burning pipeline quality natural gas or propane,.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor the heating value and sulfur content of each type of fuel combusted. The permittee may use certification from the fuel supplier to satisfy this requirement.

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60, Subpart Dc, the permittee shall monitor and maintain records of the amount of each type of fuel combusted on a daily basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall maintain the records of heating value and sulfur content for each type of fuel combusted on a weekly basis.

Emission Unit 09-001, Spreader Stoker Coal-fired Indirect Heat Exchanger:

Maximum Continuous Rating: 65 MMBtu/hr

Construction Commenced: before 1972

To preclude the applicability of CAA Section 112(j), source-wide emissions of hydrogen chloride shall not exceed 9.0 tons in any twelve (12) consecutive months.

The permittee may use the test information submitted to the Division on January 20, 2006 that relates HCl control to lime feed rate, to calculate the monthly HCl emission rate using the following equation:

Monthly HCl emissions = C x 3.48 lbs HCl/ton of coal x (1 – CF/100)

C = coal usage (tons/month)

CF = control efficiency = $7 \times 10^{-5}L^3 - 0.0216L^2 + 2.3306L$

L = average lime feed rate (lb/hr)

Derived emission factors from stack shall replace the 2006 data for future emissions calculations.

Pursuant to 401 KAR 61:015, Section 4(1), particulate emissions shall not exceed 0.48 lb/MMBtu based on a 3-hour average.

The permittee may assure compliance with the particulate matter standard by calculating particulate matter emissions using the following formula:

$$\text{Particulate Matter emissions (lb/ton)} = \left[\left[(17 \text{ lb/ton}^*) / (13,456 \text{ Btu/lb}^{**}) \right] / (2,000 \text{ lb/ton}) \right] \times [1,000,000 \text{ Btu/MMBtu}] \times (\% \text{ efficiency}^{***})$$

* = emission factor from AP-42

** = 13,456 is the coal's heating value in Btu/lb by Jim Beam Co.

*** = (1 – baghouse control efficiency)

Pursuant to 401 KAR 61:015, Section 4(3)(b), opacity emissions shall not exceed 40% except that a maximum of 60 % opacity shall be permissible for not more than 6 consecutive minutes in any 60 consecutive minutes during cleaning the fire box or blowing soot.

Pursuant to 401 KAR 61:015, Section 4(3)(c), opacity emissions shall not exceed 40 % except for emissions during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 401 KAR 61:015, Section 5(1), sulfur dioxide emissions shall not exceed 4.52 lb/MMBtu based on a 24 – hour average.

The permittee may assure compliance with the Sulfur Dioxide emission standard by calculating Sulfur Dioxide emissions using the following formula:

$$\text{SO}_2 \text{ emissions (lb/ton)} = \left[\left[(38 \text{ lb/ton}^* \times 0.86^{**}) \times (13,456 \text{ Btu/lb}^{***}) \right] / (2000 \text{ lb/ton}) \right] \times [1,000,000 \text{ Btu/MMBtu}]$$

* = emission factor from AP-42

** = percent sulfur in coal by Jim Beam Co.

*** = heating value of coal by Jim Beam Co.

The permittee shall conduct a performance test for particulate matter, particulate matter smaller than 10 microns, sulfur dioxide, and hydrogen chloride by the start of the fourth year of this permit in order to demonstrate applicability of the equations for compliance with the applicable operating limitation standards.

Pursuant to 40 CFR 64.6, Compliance Assurance Monitoring, Table 1 (see below) shows the monitoring approach for particulate matter (PM). The permittee shall conduct this monitoring and fulfill all other obligations specified in 40 C.F.R §§ 64.7 through 64.9.

TABLE 1 - MONITORING APPROACH

Applicable CAM Requirement	PM/PM ₁₀ limits
General Requirements	<p>(1) 0.41 lb/MMBtu filterable particulate limit, based on a 3-hour average</p> <p>(2) Less than 40% Opacity except (1) maximum of 60% opacity for not more than 6 consecutive minutes in any consecutive 60 minutes during cleaning the fire-box or blowing soot, and (2) during boiler startup when manufacturer's recommendations are followed.</p>
Monitoring Methods and Location	<p>(1) Differential pressure across the baghouse shall be monitored; proper operation of the baghouse shall be maintained.</p> <p>(2) Daily visual observations of the stack plume shall be performed. USEPA reference Method 9 shall be performed if visual emissions are observed.</p>
<p>Indicator Ranges</p> <p>The permittee may adjust the indicator ranges pursuant to 40 CFR 64.7 (e) based on results from subsequent performance tests for PM compliance and with the Division's approval.</p>	<p>(1) The baghouse has an operating range of 2-8" (w.c.) of pressure drop, in accordance with manufacturer's specifications. An inspection of the baghouse shall be performed if pressure drops occur outside the operating range.</p> <p>(2) The presence of visible emissions during normal boiler operations shall require the permittee to initiate opacity monitoring in accordance with USEPA Reference Method 9. The permissible indicator range for Method 9 readings shall be 0 – 40% opacity.</p>
Data Collection Frequency	<p>(1) Baghouse differential pressure is recorded continuously on an ISQL server.</p> <p>(2) Visual observations of the stack plume are performed daily when the boiler is operating. USEPA Reference Method 9 observations are collected and an inspection of the baghouse is performed when visible emissions from the stack are observed.</p>
Averaging Period	<p>(1) Baghouse differential pressure readings records from the ISQL server will be analyzed to show pressure drop as a function of time. Pressure drop values will be marked on a scaled axis if a graph is used. Exceedances and excursions of the operating range will be specifically identified. Analysis of the baghouse differential pressure readings will be included in the semiannual report.</p> <p>(2) Reference method 9 readings, if required, shall be reported as 6-minute averages.</p>
Recordkeeping	<p>(1) Baghouse operating parameters shall be maintained for a period of 5 years.</p> <p>(2) Daily visual observations and Method 9 readings (if any) shall be maintained for a period of 5 years.</p>
QA/QC	<p>(1) An excursion for PM emissions shall be defined as (1) three consecutive baghouse differential pressure readings outside the operating range listed above in a rolling 24-hour period and (2) one six minute average opacity reading collected using USEPA Reference Method 9 that is above the opacity limit mentioned above.</p> <p>(2) The permittee shall initiate an investigation and take corrective action for each excursion.</p> <p>(3) The Quality Improvement Plan (QIP) threshold for baghouse pressure drop is 5 excursions within a rolling 3-month period. This threshold level is 5 percent (5%) of the total 24-hour data recording periods. The QIP threshold for Method 9 observations is either (1) 4 excursions in a rolling 3-month period or (2) 3 consecutive weekly excursions.</p> <p>(4) If the QIP threshold is triggered in a semiannual reporting period, a QIP shall be developed and implemented. Baghouse monitoring parameters will be maintained and operated in accordance with manufacturer recommendations. Records of Method 9 certifications will be maintained. Differential pressure instrumentation will be calibrated a minimum of once per year. The baghouse will be externally inspected daily and internally inspected at least once per year. Records of all inspections and calibrations will be maintained.</p>

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor and maintain records of the heating value, ash content, and sulfur content of coal by obtaining certification from the fuel supplier for each shipment of coal received on a weekly basis.

Pursuant to 401 KAR 61:015, Section 6(3), the permittee shall monitor and record the amount of fuel combusted on a daily basis.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall monitor the average feed rate of lime in lbs/hr when the unit is operating.

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60 Subpart Dc, the permittee shall maintain the records of the amount of each type of fuel combusted on a daily basis.

EMISSION AND OPERATING CAPS DESCRIPTION:

To preclude the applicability of CAA Section 112(j), Jim Beam-Booker Noe Distillery shall limit source-wide HAPs emissions to less than 9 tons per year (tpy) for any individual HAP pollutant and 22.5 tons per year (tpy) for any combination of HAP pollutants. For Emissions Unit 09 (09-001) Indirect Heat Exchanger HCl emissions shall not exceed 9 tons/year in any twelve (12) consecutive months. This will be achieved through the following calculations:

$$\text{Monthly HCl Emissions} = C \times 3.48 \text{ lb HCl/ton coal} \times (1 - \text{CF}/100)$$

C = coal usage (tons/month)

CF = control efficiency = $7 \times 10^{-5}L^{-3} - 0.0216L^{-2} + 2.3306L$

L = average lime feed rate (lb/hr)

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.